



12-09-99

520 Rec'd PCT/PTO 08 DEC 1999

PCT

FORM PTO-1390 (REV 11-98)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER
				7218-000002
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/445617
INTERNATIONAL APPLICATION NO PCT/CA98/00559	INTERNATIONAL FILING DATE 9 June 1998		PRIORITY DATE CLAIMED 9 June 1998	
TITLE OF INVENTION SYNTHETIC TURF GAME SURFACE				
APPLICANT(S) FOR DO/EO/US Alain Lemieux				
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:				
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input checked="" type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). Items 11. to 16. below concern document(s) or information included: 11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: - Verified Statement Claiming Small Entity Status. - Article 19 Amendment of July 24, 1998 with a new Abstract and two sheets of formal drawings for PCT International Application No. PCT/CA98/00559.				

U.S. APPLICATION NO. (if known, see 37 CFR 1.9) 09/445617	INTERNATIONAL APPLICATION NO. PCT/CA98/00559	ATTORNEY'S DOCKET NUMBER 7218-000002																
17. <input checked="" type="checkbox"/> The following fees are submitted:		CALCULATIONS PTO USE ONLY																
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :																		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$970.00																		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00																		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00																		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00																		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00																		
ENTER APPROPRIATE BASIC FEE AMOUNT =		\$840.00																
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		\$																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">CLAIMS</th> <th style="width: 35%;">NUMBER FILED</th> <th style="width: 20%;">NUMBER EXTRA</th> <th style="width: 30%;">RATE</th> </tr> </thead> <tbody> <tr> <td>Total claims</td> <td>11 - 20 =</td> <td>0</td> <td>X \$18.00</td> </tr> <tr> <td>Independent claims</td> <td>1 - 3 =</td> <td>0</td> <td>X \$78.00</td> </tr> <tr> <td colspan="2">MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td> <td></td> <td>+ \$260.00</td> </tr> </tbody> </table>		CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	11 - 20 =	0	X \$18.00	Independent claims	1 - 3 =	0	X \$78.00	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE															
Total claims	11 - 20 =	0	X \$18.00															
Independent claims	1 - 3 =	0	X \$78.00															
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00															
TOTAL OF ABOVE CALCULATIONS =		\$840.00																
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).		\$420.00																
SUBTOTAL =		\$420.00																
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		\$																
TOTAL NATIONAL FEE =		\$420.00																
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property		+																
TOTAL FEES ENCLOSED =		\$420.00																
		Amount to be: refunded																
		charged																
<p>a. <input type="checkbox"/> A check in the amount of <u>\$420.00</u> to cover the above fees is enclosed</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>08-0750</u>. A duplicate copy of this sheet is enclosed.</p>																		
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.																		
SEND ALL CORRESPONDENCE TO: Harness, Dickey & Pierce, P.L.C. P.O. Box 828 Bloomfield Hills, MI 48303																		
 SIGNATURE: Garrett C. Donley																		
NAME 34,579																		
REGISTRATION NUMBER																		

Attorney Docket No. 7218-000001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit:

Examiner:

Inventor: Alain Lemieux

Serial Number:

Filed:

For: SYNTHETIC TURF GAME SURFACE

Patent No.

Issued:

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) AND 1.27(b)) - INDEPENDENT INVENTOR**

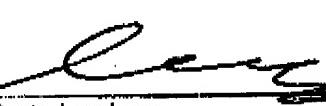
As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention described in

- the specification filed herewith.
 the application whose serial number is set forth above.
 the patent set forth above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not likewise be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Signature 
(Typed Name) Alain Lemieux

Date 12-07-09

09/445617

420 Rec'd PCT/PTO 08 DEC 1999

CANADIAN INTELLECTUAL PROPERTY OFFICE
IN THE CANADIAN PATENT OFFICE
(AS DESIGNATED OFFICE UNDER P.C.T.)

Hull, Quebec
July 24, 1998

International Serial No: PCT/CA98/00559

International Filing Date: June 9, 1998

Applicant: 2752-3273 QUEBEC INC. ET AL

Title: "Synthetic Turf Game Surface"

The Commissioner of Patents,
Ottawa, Canada, K1A 0C9.

Madam,

In response to the invitations of June 26, 1998 applicant provides herewith;

1. A new sheet containing the abstract, from which the title has been deleted; and
2. Two new sheets of formal drawings containing figures 1 to 9.

It is believed that the problems with the application as identified in the invitations have now been rectified with the submissions herewith and that the application is in proper formal condition.

Respectfully submitted,

2752-3273 QUEBEC INC. ET AL

Encl.

pg/24169
Tel: 770-8842

BY: _____

H. Wayne Rock, Partner
MacRae & Co.

ABSTRACT OF DISCLOSURE

A synthetic turf surface for golf courses, tennis courts and other grass-surfaced game playing fields is formed of a synthetic grass carpet having a flexible base sheet 5 with closely spaced-apart upright, blade-like strands of plastic material forming a dense grass-like surface. The carpet is supported upon a cushioning underpad which is formed of a thick, molded sheet of open cell, expanded bead polypropylene. The resiliently compressible polypropylene underpad combined with the synthetic grass carpet closely simulates the feel of a natural grass covered playing field surface.

- 1 - 420 Rec'd PCT/PTO 08 DEC 1999

SYNTHETIC TURF GAME SURFACE

TECHNICAL FIELD

This invention relates to an improved synthetic turf surface for grass-type game playing fields.

5 BACKGROUND OF INVENTION

Synthetic turf game playing surfaces typically are formed of carpets having upright piles or strands that are fastened to a base or backing sheet. The strands may be formed of thin, flat, narrow strips of suitable plastic material which may be gathered into tufts that are fastened to the base sheet. Commonly, the base sheet

10 is formed of a woven cloth, made of a suitable plastic fabric, with a resilient coating or binder applied to the base sheet for anchoring the strands thereto. The detailed construction of such pile carpets varied considerably. However, in general, they are made of a weather resistant or outdoor type of construction.

Such carpets are usually laid upon a prepared, flat ground surface to form a game playing field which is intended to simulate a natural grass playing field surface. For some types of games, a resilient underpad is placed beneath the carpet and upon the firm ground support surface to provide a shock absorbing effect. Also, in some instances, a layer of sand or other particulate material is placed upon the upper surface of the carpet base sheet and around the strands. An example of this type of construction is shown in U.S. Patent No. 4,389,435 issued June 21, 1983 to Frederick T. Haas, Jr. Another example is shown in U.S. Patent No. 4,637,942 issued January 20, 1987 to Seymour A. Tomarin.

Further, examples of artificial turfs which are formed with the grass-like carpet placed upon a resilient underpad are disclosed in U.S. Patent No. 3,551,263 issued December 29, 1970 to Carter et al., which discloses a polyurethane foam underpad; U.S. Patent No. 3,332,828 issued July 25, 1967 to Faria et al., which discloses a PVC foam plastic or polyurethane foam plastic underpad; U.S. Patent No. 4,637,942 issued January 20, 1987 to Seymour A. Tomarin which discloses a rubber-like underpad; U.S. Patent No. 4,882,208 issued November 21, 1989 to Hans-Urich Brietschidel, which illustrates a closed cell polyethylene foam underpad; U.S. Patent No. 3,597,297 issued August 3, 1971 to Theodore Buchholz et al., which discloses a polyurethane underpad having voids; and U.S. Patent No. 4,505,960 issued March 19, 1985 to

James W. Leffingwell, which discloses shock absorbing pads made of foamed polyvinyl chloride, polyethylene, polyurethane, polypropylene, etc.

As these various prior patents demonstrate, there has been a search in the past for an underpad material and construction which, when combined with a suitable

- 5 synthetic blade forming carpet, provide a game playing surface which very closely simulates the feel and action and reaction effect of a natural grass playing field surface. The large variety of materials disclosed in the foregoing patents demonstrate that such a synthetic turf playing surface had not been found.

- The present invention relates to a particular plastic underpad surface
10 combined with an artificial grass forming carpet which very closely simulates a natural grass field which is particularly close in feel and performance to the natural grass portions of a typical golf course, as well as being very similar to other natural grass surface game playing fields.

SUMMARY OF INVENTION

- 15 This invention contemplates combining with a synthetic grass carpet a particular resilient polypropylene molded underpad which, together with the synthetic grass carpet, produces an effect which is strikingly similar to a natural grass playing surface formed particularly for golf courses. Thus, this invention contemplates utilizing expanded beads of polypropylene of a density of approximately between
20 about 1.3 to 2.8 pounds per cubic foot molded into a thick sheet or pad of open cell structure with a density of between about 1.5 to 3 pounds per cubic foot. The combined turf carpet and supporting underpad effect may be enhanced by treating the free ends of the synthetic grass blades with a sandblast which splits or shreds the blade ends into fine slivers which intertwine and entangle with each other to form a
25 dense mat upper surface upon the carpet.

An object of this invention is to provide an artificial turf with a particular resilient underpad formed of open cell, expanded beads polypropylene plastic which produces, as part of the turf surface, an effect which very closely simulates a natural grass playing field.

- 30 These and other objects and advantages of this invention will become apparent upon reading the following description, of which the attached drawings form a part.

DESCRIPTION OF DRAWINGS

- FIG. 1 is a schematic, fragmentary, cross-sectional end view of a synthetic turf
35 pile carpet.

FIG. 2 is a schematic view similar to FIG. 1, showing the carpet positioned upon a resilient, molded open cell, expanded bead polypropylene underpad.

FIG. 3 is a view, similar to FIG. 2, illustrating the step of sandblasting the upper end portions of the blade forming strands of the carpet.

5 FIG. 4 schematically illustrates the artificial turf surface with the dense mat formed by the shredded slivers and with a layer of sand deposited by the sandblasting step upon the upper surface of the carpet base sheet.

10 FIG. 5 schematically illustrates a further, optional, step of spraying the carpet with a water wash for further severing the slivers on a strand while additionally 10 entangling or intertwining adjacent slivers to form the dense mat surface and, also, a rotary brush treating the upper surface of the mat.

FIG. 6 schematically illustrates a single U-shaped strand whose free upper ends have been shredded into fine slivers by the sandblasting treatment.

15 FIG. 7 schematically illustrates a fragmentary portion of a golf course where 15 the golfer may use a Tee.

FIG. 8 is an enlarged, fragmentary, schematic, cross-sectional view showing a Tee inserted in a slot provided in artificial turf which has a mat formed on its upper surface.

20 FIG. 9 is a view similar to FIG. 8 showing a Tee inserted in a slot formed in 20 turf which is not formed with upper end slivers and a matted surface.

DETAILED DESCRIPTION

FIG. 1 schematically illustrates a fragment of a synthetic turf pile carpet. The carpet has numerous, closely spaced, tufts 11 which are formed of U-shaped, flat, narrow bent strips or strands 12 that form artificial grass blades. The turfs are 25 fastened upon a base or backing sheet 14. This sheet may be made of a woven cloth or the like fabric material formed of stable, weather resistant, plastic such as polypropylene or nylon fibers or the like. The specific cloth must be flexible but, otherwise, may vary as to its composition.

As schematically illustrated in FIG. 1, the tufts are inserted around or through 30 the fibers forming the base sheet. A suitable binder layer 16 may be applied to bind the turfs and base sheet together. The binder may be formed of a polyurethane adhesive material or some other suitable, outdoor usable adhesive which remains resilient or flexible.

The carpet is placed upon a resilient cushion underpad 18. This underpad is 35 formed of a relatively thick, molded sheet or pad of resilient, open cell, expanded

bead polypropylene. The sheet may be approximately between about 1/2 inch to 2 inches in thickness, with a preferred density of approximately 2.36 pounds per cubic foot. The density may be varied within the range of between about 1.5 to 3 pounds per cubic foot. The thickness of the pad, depending upon the particular results desired, may also be varied from about 1/4 inch thickness to as much as up to 12 inches thick.

With the carpet positioned upon the resilient cushion underpad 18, the upper portions of the strands or blades are sprayed with a blast of sand 20 or similar sand-like particulate material from a pressurized nozzle 21. This blast of sand shreds each 10 of the strand upper end portions into numerous slivers 23 (see FIG. 6). The slivers extend laterally and intertwine and entangle together to form a dense mat 24.

The spray nozzle 21 may be moved back and forth from one side to the other in a scanner-like movement across the upper end portions of the blades formed by the strands. The exact pressure of the sand blast spray may be varied. However, 15 a preferred blast pressure is in the range of 100 to 120 pounds per square inch. The blast may use silica sand of a size range of between about 16 to 40 mesh and, preferably, in the range of between about 20 to 24 mesh or even more preferably in the approximate area of 24 mesh. The sandblasting is conducted at a speed of movement and for a length of time which is sufficient to shred the strand end portions 20 into finely divided slivers. For example, the upper, about one-fifth portions of the blades may be shredded into fine slivers that remain attached to their respective blades.

The force of the sand blast, depending upon how long, that is, how slowly the blast is moved across the surface of the carpet, not only shreds the blades, but also 25 forces the sprayed sand downwardly between the strands to deposit sand upon the surface of the base sheet of the carpet. The sand layer 25 formed thereby may be kept upon the base sheet of the carpet where it is maintained in position by the dense intertwined or entangled sliver mat formed on the upper ends of the blades.

By way of example, a blade height of approximately 5/8 of an inch above the 30 surface of the base sheet, which is useful for a golf green surface may have its upper 20 to 33 percent of its length shredded into fine slivers. In this example, strands which are approximately 1/16 of an inch, i.e. about 0.07 inches, wide and about 0.002 inches thick, so that they are approximately rectangular in cross-section. They are bent in half, to form two blades, and are gathered into tufts of about 9 to 11 strands. 35 These form about 18 to 22 blades per tuft. The upper about 20 percent portions of

each blade may be severed into about four slivers. Thus, each tuft may have as many as about 70 to 80 slivers whose lower ends remain attached to the blade body and whose upper ends extend off into transverse directions to entangle with the slivers of adjacent strands. The slivers are about 0.02 inches in width and about 5 0.075 to 0.125 inches long.

Following the sandblasting step, the carpet may be further treated with a high pressure water spray 27 applied by a pressurized nozzle 28. The water spray, which, for example, could be at a roughly 100 to 150 pounds per square inch nozzle pressure, acts like a wash which further separates adjacent slivers that were 10 shredded, but not fully separated from each other on the same strand, and simultaneously further twists, bends and entangles the slivers of one strand with slivers on its adjacent strand to further densify the mat formed by the intertwined slivers. This forms a denser and more uniform mat surface.

The mat surface may be further treated by brushing it with, for example, a 15 rotary brush 29 applied upon the mat surface to make the mat surface more uniform.

The water jet and the brushing may be performed successively or at the same time as schematically illustrated in FIG. 5.

Significantly, the force of the sandblasting is sufficiently absorbed through the resilient cushioning pad beneath the carpet to prevent the strands from becoming 20 crushed or permanently deformed or compacted by such force. That is, the strands remain or return to their upright positions after their upper ends are sand blasted. The upright positions are maintained, in part, by the deposited sand layer 25. Similarly, the strands and the mat 24 hold the sand layer 25 in place.

The sand layer filling may be kept in place and the matted carpet may be 25 rolled and transported to the site where it is to be spread and used with the sand layer. This permits the sand blast treatment to be performed either on the site of the game playing field or at any work site or factory area where the application of the sand, water and brushing treatments may be more conveniently performed. Thus, the treated carpet may be unrolled and installed at the game surface site when desired 30 and the sand layer will remain in place and additional sand at the use site for a sand filling may not be needed.

As mentioned, the particular pile carpet construction may be varied. However, an example of a useful carpet for a golf green comprises synthetic grass of approximately 7,600 deniers, an approximate density of 42 ounces per square yard,

and a fiber height of approximately 5/8 inch combined with an underpad of 1/2 inch to 2 inches in thickness.

Similarly, an example of a fairway portion of a golf course may be in the range of approximately 7,600 deniers synthetic grass, an approximate density of 42 to 55
5 ounces per square yard, with a fiber height of about 5/8 to 2 inches with an underpad of at least about one inch thick.

Still another example of the synthetic grass would be a weaving standard in the range of 3,600 to 10,000 deniers, with 13 to 22 stitches per 3 inches, 3/16 gage and a density of about 34 to 65 ounces per square yard of material.

- 10 The raw beaded polypropylene material is commercially available and can be molded into underpads of the desired density. By way of example, expanded polypropylene beads are available from BASF under the trade name of NEOPOLEN P, which is a trademark of BASF. This material is available at densities of 1.3, 1.9 and 2.8 pounds per cubic foot and is referenced by BASF by its trademark EPERAN
15 PP, types PP45, PP30 and LBS 20. When the beads are molded in appropriate slab molding equipment at times and pressures known to those skilled in the art, the resulting pad, produced in the desired thickness, can be made in a density ranging from 1.5 to 3 pounds per cubic foot. The molded slab or sheet will have an open cell construction. The specific density selected may be varied for specific sport activities.
20 For example, a density that has been found satisfactory for a golf green is in the range of approximately 2.36 pounds per cubic foot.

- The particular technique useful for the sandblast treatment involves sandblasting under pressure using commercially available sandblast equipment. A pressure in the range of 100 to 120 pounds per square inch is preferred but the
25 pressure may be varied somewhat, such as a low of about 80 pounds per square inch. By moving the spray nozzle in back and forth movements across the surface of the carpet, the projected spray is sequentially concentrated upon small portions of the carpet. The angle of the projected spray may vary but a preferred angle, which appears to be effective in a minimum of time, is an angle of about 70 to 80 degrees
30 relative to the plane of the carpet. The distance of the nozzle from the strands may vary, with the equipment operator selecting the optimum distance by visually observing the shredding action of the spray. An example of the distance may be in the range of about 4 to 5 feet, depending upon the speed of movement of the nozzle across the carpet.

2025 RELEASE UNDER E.O. 14176

The resulting synthetic turf is particularly useful for golf courses, such as the green portions, approach portions, Tee-off portions and fairway. The turf surface also may be used for tennis courts, football or soccer as well as for other sports which utilize grass surfaces. Examples of these are grass hockey, croquet, grass bowling,
5 children playground, baseball, and the like. The surface of the artificial turf produced by the method herein, closely simulates the feel and action or rebound produced by a natural grass surfaced playing field. The completed, matted surface very closely simulates the natural grass surfaces required for golf courses and the similar playing fields. This turf may also be useful upon a rooftop or patio or deck surface where the
10 turf will provide an insulated, waterproof covering.

As illustrated in FIGS. 7 and 9, the turf may be used on golf courses in Tee-off places, that is, at locations where the golfer uses a Tee to support the ball for a drive. In those locations, a number of slits 30 may be made in the turf carpet base sheet and underpad to receive a manually inserted standard Tee. The slits 30 may be of
15 a size to closely receive a Tee 31. To assist the golfer in locating a particular slit, a colored mark 32 may be applied, as by a suitable ink or paint mark, on the surface of the turf. FIG. 7 shows the turf with the sliver forming mat and FIG. 8 shows the turf mold without the surface mat. In either case the slots can be used to receive the golfer's Tee.

20 This invention may be further developed within the scope of the following claims. Accordingly, it is desired that the foregoing description be read as being merely illustrative of an operative embodiment of this invention and not in a strictly limiting sense.

CLAIMS

1. A synthetic turf surface for golf and other grass-type game playing surfaces formed of a synthetic grass carpet having a flexible base sheet with closely spaced apart, upright blade-like strands of plastic material secured to the sheet, and
5 with the strands forming a densely packed, exposed upper surface and said base sheet being positioned upon a resilient cushion underpad arranged upon a firm support surface, the improvement comprising:

said underpad being formed of a relatively thick sheet of a molded, open cell, expanded, resilient polypropylene bead material;

10 whereas said carpet and its supporting underpad closely simulate a portion of a natural grass golf course surface, such as a green or tee-off or fairway portion and similar grass-type playing surfaces.

2. A synthetic turf surface as defined in claim 1 and said polypropylene beads being of density of between about 1.3 to 2.8 pounds per cubic foot and said
15 underpad being of a thickness of between about 1/4 inch to 12 inches.

3. A synthetic turf surface as defined in claim 2 and said polypropylene material being of a density of approximately between about 1.3 and 1.9 pounds per cubic foot and a thickness of approximately between about 1 inch to 2 inches whereby the surface forms a simulated natural golf green or a tee-off portion of a golf course.

20 4. A synthetic turf surface as defined in claim 2 and with the density of said polypropylene material being approximately 1.9 pounds per cubic foot and of a thickness of approximately between about 1/2 inch to 1 inch thickness to form a simulated natural grass tennis court playing surface.

25 5. A synthetic turf surface as defined in claim 2 and with the density of said polypropylene material being approximately 1.3 pounds per cubic foot and said underpad being approximately between about 1 to 2 inches thick to form a simulated natural golf surface tee-off portion.

6. A synthetic turf surface as defined in claim 2 and with the density of said polypropylene material being in the range of approximately 1.9 pounds per cubic foot and the thickness of the underpad being approximately between about 1 to 2 inches, to form a simulated natural golf green surface.

5 7. A synthetic turf surface as defined in claim 1 and said underpad being molded of expanded polypropylene beads of approximately between about 1.3 to 2.8 pounds per cubic foot density and approximately between about 1/2 inch to 2 inches thickness, molded into a unitary, open cell, pad of a density of approximately between about 1.5 to 3 pounds per cubic foot.

10 8. A synthetic turf surface as defined in claim 7 and with the density of said molded underpad being approximately 2.36 pounds per cubic foot to form a simulated natural golf green or the like portion of a golf course surface.

15 9. A synthetic turf surface as defined in claim 1 and including the upper end portions of said strands being shredded into fine silvers which are densely matted and intertwined, and with a layer of sand-like particulate material applied upon the upper surface of the base sheet and generally beneath the intertwined slivers and substantially filling the interstices between the strands and said layer is covered by said intertwined slivers.

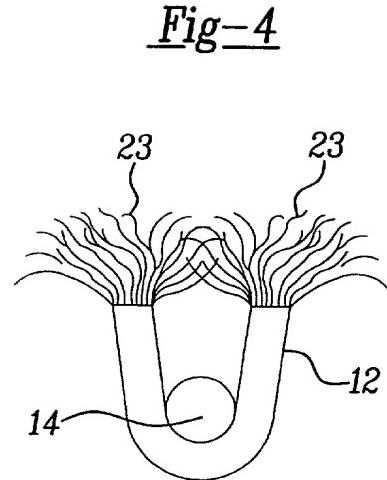
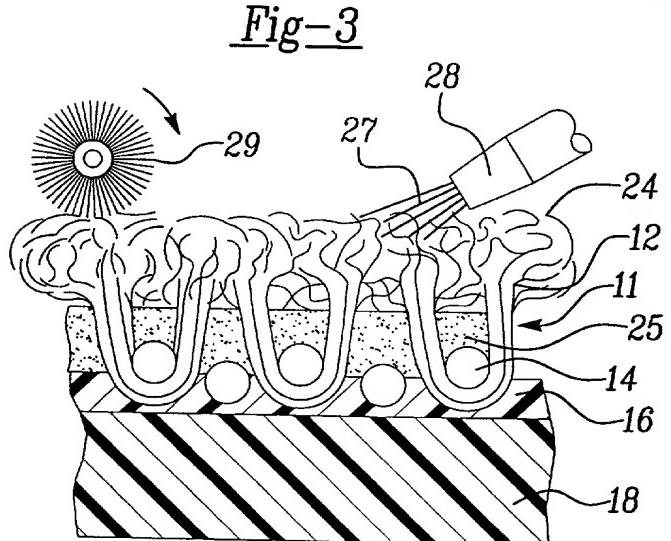
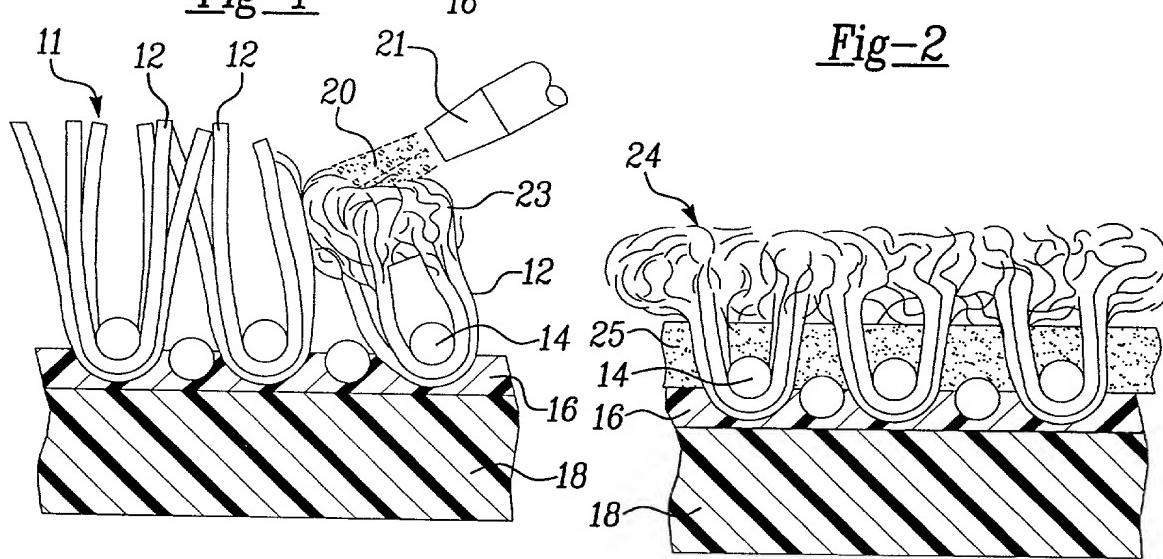
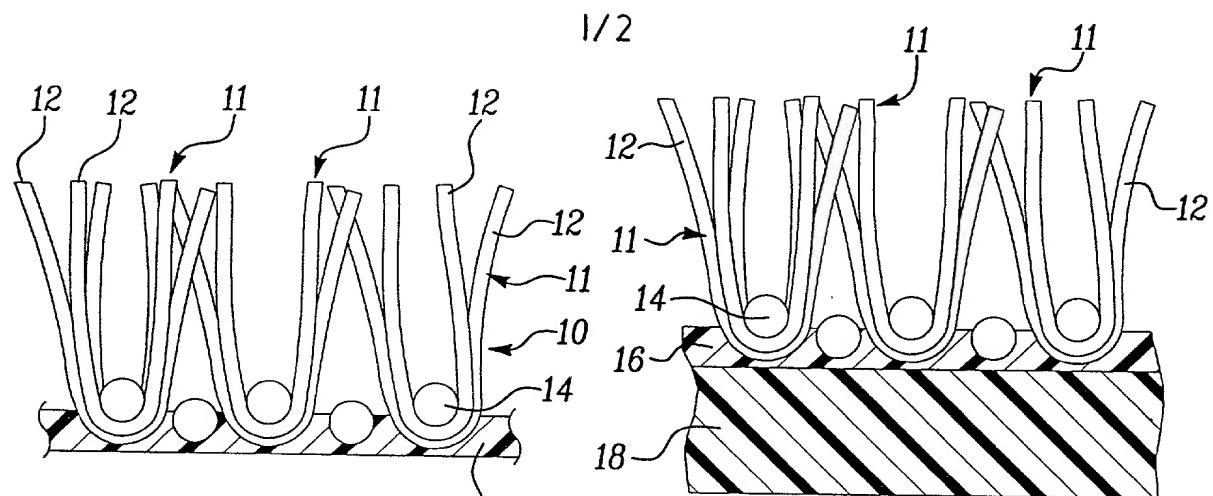
10. A synthetic turf surface as defined in claim 1 and including an adhesive-like reinforcement layer of a flexible, resilient material, applied to the lower surface of the base sheet and above the upper surface of the underpad and formed of a synthetic plastic material such as a polyurethane plastic.

20 25 11. A synthetic turf surface as defined in claim 1 and including numerous, spaced-apart, short slits formed in the carpet with the slits being of a size to temporarily receive a downwardly inserted standard size golf tee, whereby a golf player may manually insert a tee in any selected slit to support a golf ball for a drive.

SYNTHETIC TURF GAME SURFACE

ABSTRACT OF DISCLOSURE

A synthetic turf surface for golf courses, tennis courts and other grass-surfaced game playing fields is formed of a synthetic grass carpet having a flexible base sheet
5 with closely spaced-apart upright, blade-like strands of plastic material forming a dense grass-like surface. The carpet is supported upon a cushioning underpad which is formed of a thick, molded sheet of open cell, expanded bead polypropylene. The resiliently compressible polypropylene underpad combined with the synthetic grass carpet closely simulates the feel of a natural grass covered playing field surface.

Fig-6

2/2

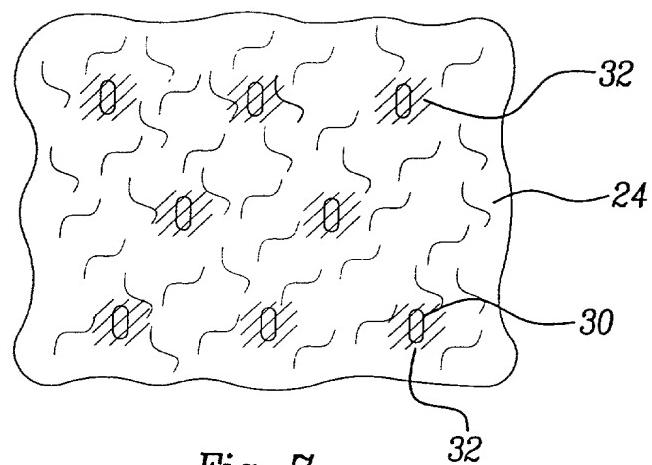


Fig-7

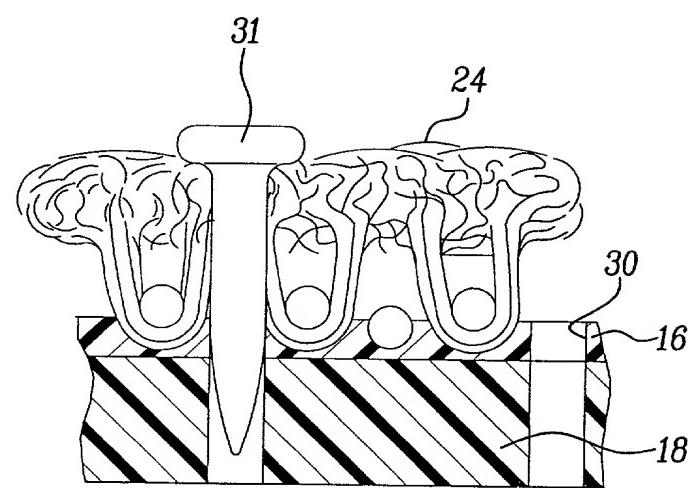


Fig-8

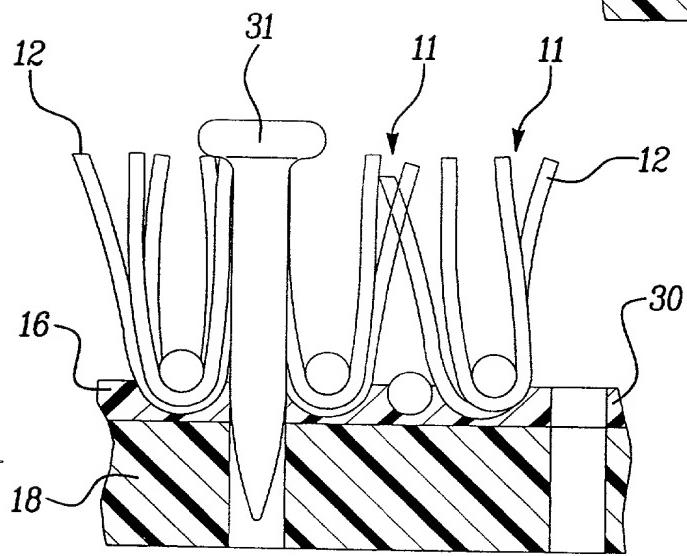


Fig-9

Attorney Docket No. 7218-00000?

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

SYNTHETIC TURF GAME SURFACE

the specification of which (check one)

Is attached hereto.

was filed on _____ as Application
Serial No. _____ and was amended on

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information that is material to the patentability of the invention claimed in this application, or information that is material to the examination of this application, in accordance with Title 37, Code of Federal Regulations, section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, section 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

			<u>Priority Claim</u>	
<u>PCT/CAN/000559</u> (Number)	<u>Canada</u> (Country)	<u>6/9/98</u> (Day/Month/Year filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Received: 12/8/99 14:37;
12/08/1999 14:36 3418364

3418364 -> HARNESS, DICKEY; Page 7

ACCES EMPLOI
BLUE SUMMIT/NUGREEN

905 6887282

PAGE 07
P. 08

DEC. 8.1999 10:17AM HARNESS DICKEY 248 641 0278

NO. 303 P. 8

DECLARATION AND POWER OF ATTORNEY

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States Provisional application(s) listed below:

PRIOR PROVISIONAL APPLICATIONS

(application serial number)

(Month / Day / Year filed)

(application serial number)

(Month / Day / Year filed)

I hereby claim the benefit under Title 35, United States Code, section 120 of any United States application(s) listed below and, Insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application;

Application Serial No.	Filing Date	Status • patented, pending, abandoned

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

J I hereby appoint Bernard J. Cantor, Reg. No. 17336, Garrett C. Donley, Reg. No. 34579, and each principal, attorney of counsel, associate and employee of Harness, Dickey & Pierce, P.L.C., who is a registered Patent Attorney, my attorney with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. I request the Patent and Trademark Office to direct all correspondence and telephone calls relative to this application to Harness, Dickey & Pierce, P.L.C., P.O. Box 828, Bloomfield Hills, Michigan 48303 (248) 641-1600.

100 Full name of sole or first inventor: Alain Lemieux

Inventor's signature: [Signature]

Date: 12-07-99

Residence: 1360 Cherbourg Street, Sherbrooke, Quebec J1K 2P2 Canada CAX

Citizenship: Canadian

Post Office Address: Same as above